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ABSTRACT

This publication includes curriculum materials on animals for grades K-4. The major purposes of this publication are to foster individualized and interdisciplinary science and art activities within elementary classrooms and to provide pupils and teachers with suggestions to encourage the use of zoos, animal parks, and natural history museums. Activities are described for studying animal babies, animal communities, animal habitats, and the web of life. (MH)

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SAN DIEGO CITY SCHOOLS
PROGRAMS DIVISION
INSTRUCTIONAL SUGGESTIONS BULLETIN

CLASSROOM LEARNING CENTERS: ANIMALS LEVELS A-D

A Supplementary Approach for Teaching Science and Art

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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PREFACE

This publication is one of two instructional suggestions bulletins for implementing Classroom Learning Centers related to animals, grades K-6. This first bulletin is concerned with primary grades, levels A-D. The second bulletin deals with upper grades, levels E-I. The major purposes of these publications are (1) to foster individualized and interdisciplinary science-art activities within elementary classrooms and (2) to provide pupils and teachers with suggestions to encourage the use of the San Diego Zoo, the Wild Animal Park, and the San Diego Natural History Museum.

Acknowledgments for assistance from beyond the advisory committee should be made to Cora Jensen and Kathy Meagher of the San Diego Zoo Educational Staff and Howard Weisbrod of the Natural History Museum. Also, Dr. James Retson and Charlene Roux were instrumental in providing a district in-service class on individualizing instruction during the summer of 1971, which influenced the development of this bulletin.

Other acknowledgments include the team of six teachers at Carson Elementary School who in 1971-72 implemented a Teacher-Initiated Project related to individualized instruction with administrative support from the principal, Mr. Jack Radican.

This instructional bulletin, of course, is subject to further evaluation and refinement. Suggestions for improvement are welcome and will be appreciated. An evaluation form is provided on the last page of this publication.

Jack Price
Assistant Superintendent
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INTRODUCTION

Point of View

Current technology and civilization are causing animal species to become extinct at a rate of one species or subspecies a year. This is reason enough to place more emphasis on teaching about animal life. The management and care of the biosphere are essential to the future well-being of mankind. There is deep concern that pupils have knowledge, skills and attitudes to help correct the misuse of animals. Also, the lives of pupils may be enriched as they recognize and express the aesthetic qualities of animals, be they frogs or elephants.

Classroom Learning Centers: Animals offers a supplementary approach to the teaching of science and art.

Goals

Through the learning activities and suggestions included in the *Classroom Learning Centers: Animals* pupils will:

1. Develop care and concern for animals and their importance to a balanced ecosystem.

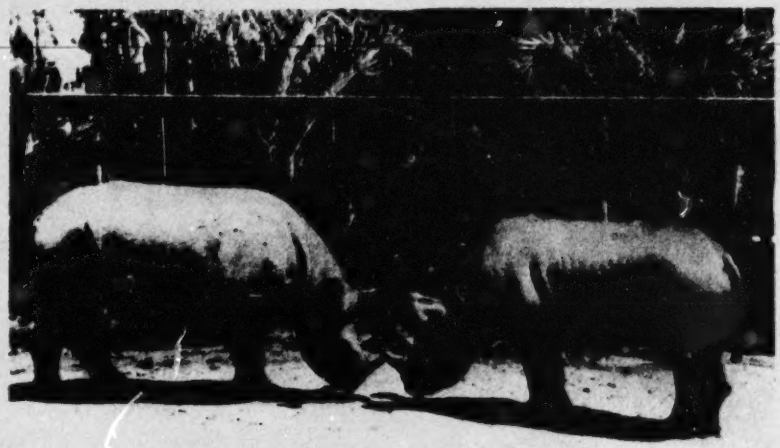
2. Develop greater capacity for learning science and art concepts independently in regard to animals.

3. Utilize the zoo, the Wild Animal Park and the Natural History Museum as science and art learning resources.

4. Decide what optional activities and projects in science and art are best suited to individual interests and aptitudes.

5. Develop selected aspects of attitudes, rational thinking, skills and knowledges as related to science concepts.

6. Develop selected aspects of visual and tactile perception, creative art expression, art heritage awareness and aesthetic judgment as related to art components.



Description of Classroom Learning Centers

Classroom Learning Centers are refinements and improvements of the familiar interest centers, science corners, book nooks, project areas, etc.--approaches that teachers have used for years.

The refinements in Classroom Learning Centers are significant:

...They emphasize instruction and learning, not pastimes, busywork nor hobbies.

...They expand teachers' effectiveness in many ways.

...They help students instruct themselves.

...They bring together and coordinate materials for quality instructional activities.

...They encourage students to pace themselves and schedule much of their own work.

Learning Centers are compactly arranged sets of materials and directions that fit easily into different areas of the classroom. Corners serve as good locations for Learning Centers because they provide extra wall space. Other favored locations include areas near shelves, bookcases, cabinet tops, and bulletin boards. Almost any Center needs places for storing materials, completing activities, and displaying completed work.

Instructional Advantages of Classroom Learning Centers

Learning Centers enhance instruction in several ways:

1. They bring materials and activities together into a compact, organized cluster.
2. They encourage students to take initiative in scheduling, beginning, and completing learning activities.
3. They lend themselves to multimedia use in learning.
4. They can provide basic instruction, application activities, and enrichment activities.
5. They provide a balanced combination of structure and student freedom.
6. They can be organized around a large variety of topics.

Steps Taken To Prepare the Classroom Learning Center Activities

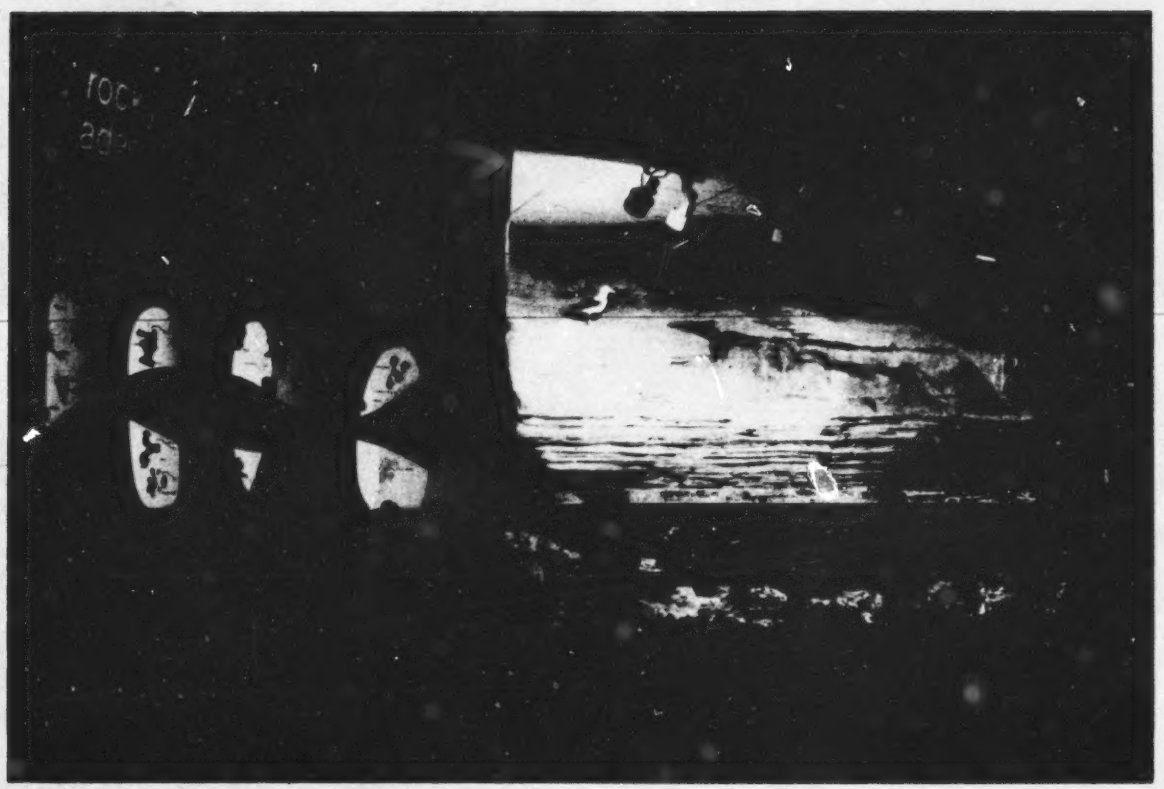
The following steps were taken in order to construct the CLC learning activities about animals:

1. Topics were selected which relate to current needs and/or problems in the schools and society related to animals, i.e. ecology and environmental problems.

2. Experience-activity type objectives were written around goals, concepts and components in science and art. These objectives were project-oriented.

3. Nongraded activities were developed for nine levels in graduated complexity, from A to I.

4. Related support materials and animals were researched and listed for each level as being readily available and collectible by the teacher.



Classroom Learning Centers: Animals--Correlation Chart

	LEVEL	UNIT	ANIMALS AND INSTRUCTIONAL MATERIALS EMPHASIZED	SCIENCE CONCEPT	ART COMPONENT
PRIMARY GRADES	A	Animal Babies	Guinea pit Sculpture kit K-1	Living things are inter-dependent with one another and with their environment.	Living things have visual characteristics (color, texture, pattern, etc.) which distinguish each species.
	B	Animal Communities	Goldfish, snail Tempera paint and patterns	Same as Level A.	Shapes can be seen in animals.
	C	Animal Habitats	Frog Tempera paint and old magazines	Same as Level A.	Color can be mixed from other colors; it can be dark or light, it can contrast or camouflage.
	D	Web of Life	Aquatic insects Papiér mâché, clay	Same as Level A.	The size and relation-ship of an object in a painting determines the importance to the viewer.
UPPER GRADES	E	Animal Adaptations	Lizard, mouse Crayons	A living thing is the product of its heredity and environment.	Same as Level A.
	F	Prehistoric Animals	Audio-visual aids, books Clay	Living things are in constant change.	Texture provides variety in our visual and tactile world.
	G	Animal Conservation	Audio-visual aids, books Assorted art materials	Same as Level A.	Color and composition express emotional feelings in painting.
	H	Animal Behavior	Mouse Assorted art materials	Same as Level E.	Living things have a quality of roundness or form.
	I	Animals in Captivity	Mouse, guinea pig Art prints and soundstrips	Same as Level A.	Artists create a style unique to them and to the time in which they live.

Organization and Rationale of CLC Booklets

Each CLC booklet is sequenced and organized as follows for teacher use in grades K-3 (levels A-D):

PRIMARY GRADES

1. *Title page*...shows the level, science concept, art component, topic, an illustration (cartoon related to the topic) and some beginning activities for pupils.

2. *Bulletin board idea and materials list*...show what the teacher needs to have on hand before introducing the CLC. The material includes audio-visual aids and library books from the Instructional Media Center, as well as art materials. Animals listed may be donated by parents, or the individual school may wish to purchase with discretionary funds. Note: There is a live material budget at each school for the regular science program.

3. *Facilitation of the CLC*. Discussion questions are listed for the teacher to help introduce the CLC to the class and initiate the main science concepts and art components for the CLC. Simple activities are sometimes suggested so that any pupil should experience success under teacher guidance.

4. *Additional activities*...are to be carried out in as independent a manner as possible by pupils the teacher selects. A project trip to the zoo, the Wild Animal Park, or the Natural History Museum are always included as possible activities.

5. *Further questions for discussion*...summarizing questions to help reinforce or extend learnings throughout the CLC.

6. *Work Sheet ideas*. Two science-art work sheets to be used as masters for ditto. These work sheets should be used only with pupils who have completed activities in the CLC.

Management of the Classroom Learning Centers

I. Introducing the Center

The way you introduce the Learning Center sets its tone for several days. Be enthusiastic about it. Be thoroughly prepared to explain every aspect. Give special attention to:

-What we can do in the Center.
-How we do each activity.
-Where we keep the materials.
-How we take the materials out, use them and replace them.
-Where we put finished work.
-How we keep records.

You will also need to discuss scheduling, responsibilities, and behavior for working in the Center.

II. Scheduling

After you have introduced the Center and students have had an opportunity to walk through it, you are ready to schedule work periods in it. Basically, you need to devise a way to show who is to work in the Center at specified times. Teachers usually allow students to choose to work in the Center during free times. They also assign students to the Center as needed. It helps to provide a schedule that everyone can see. You might want to make scheduling devices such as circular charts, pocket charts, clothespin boards, contracts, simple chalkboard notes, or even "postcards" from you to students.

Sometimes you will probably want students to work individually in the Center. At other times they can work in groups. The schedule should provide equal and ample time for all students.

III. Materials

To begin, bring together most of the instructional materials. As students get acclimated to the Center, they will be able to add activities and materials of their own.

Students should understand:

- -Where materials are stored and how to get them.
- -How and where to use the materials.
- -What to do with materials when finished.
- -How to care for the materials.

IV. Instructing

Despite your best planning, students will occasionally encounter difficulties with instructional activities. Be ready to instruct them as needed, either in the Center or elsewhere. Try to work in the Center with students as much as possible.

V. Monitoring

Especially in the early stages of using the Center, keep careful watch over what goes on there. Position the Center so it is visible from throughout the room.

VI. Assessing Performance

You will want to know several things about students' work and progress in the Center:

- -Which activities they complete.
- -How well they perform the learning tasks.
- -What skills and information they acquire.
- -How willing and eager they are to use the Center.
- -Which activities are most popular, and which seem to teach most.

You obtain this information by observing students at work, noting their interest in going to the Center, examining work they have completed, and conferring with them informally, and occasionally, if you wish, by testing them over the content of the Center.

VII. Record Keeping and Evaluation

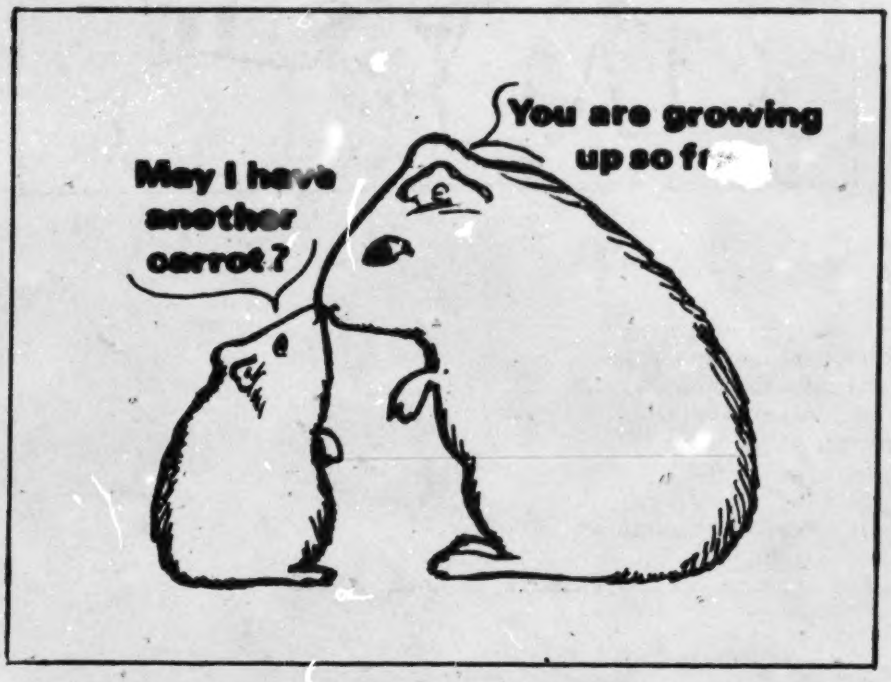
Try to keep accurate records of what has transpired in the Center. Use a checksheet to keep track of who does what--who begins activities and who completes them, and who reaches various stated objectives. Examine completed work to determine its overall quality. Conduct individual conferences to find out what students especially like and dislike about the Center, and what they think they have learned. Keep folders for each student, in which you place samples of work and notes from the individual conferences.

PUPIL CLC BOOKLETS

. *Living things are interdependent with one another and with their environment.*
. *Visual and tactile perception.*

CLASSROOM LEARNING CENTER: ANIMALS

ANIMAL BABIES



BEGINNING ACTIVITIES

1. The pupil will observe a mother guinea pig and her baby, or an adult cat and kitten, or dog and puppy. He will then describe in his own words what observable likenesses are found between parent and offspring.

2. The pupil will build a vocabulary of texture words to include *furry*, *soft*, *rough*, and *shiny* by observing and by verbally expressing or showing these qualities.

BULLETIN BOARD IDEA

MATERIALS

Animal cage
Snapshots of guinea pigs
Mother and baby guinea pig
Food and water for the guinea pigs
Filmstrip viewer
Sculpture kit K-1
Texture kit
Student vocabulary charts
Teacher's guide
CER study prints of zoo animals in each school

Book

Concepts in Science, Grade 1. Text, pages 110-13

Filmstrip:

Fs 591.5 Animal Differences (P-I)

Study Prints:

SP-S 599 Animal Babies
SP-S 591.5 Baby Animals of the Wild
SP-S 591.5 Wild Animals
SP-S 591.5 Animal Babies, Copy B
SP-S 599 Zoo Animals and Their Babies (P or I)

FACILITATION OF THE CLC

Introduce the CLC to the entire class. Ask these questions and discuss with pupils:

Science Questions for Discussion

1. How are animal babies different?
2. Do you have any animal babies at home?
3. By watching the animal babies and their parents, could you find out how the parent and the baby are alike?

Say, "Each pupil that chooses the Animal Baby Learning Center will find out more about the animals they see and hold. We will have discussion after you observe the animals. You tell us what you found out. I'll make a chart of what you tell me."

Art Questions for Discussion

1. How does an animal feel to you when you touch it?
2. Do all animals feel the same?
3. Would a baby turtle feel the same as a kitten?
4. What is texture?

Say, "We will look at and touch the animals to see how they feel to us. The way the animal feels to our touch is called its texture. We will talk about texture and the textures we feel and see."

Use Lesson #7 (Sculpture K-1) teacher's guide with texture kit. Make a chart of words used.

Observe the animals for texture. Hold the animals. Touch the feet, ears, body, and nose if possible. Record words used.

ADDITIONAL ACTIVITIES

1. Visit the San Diego Zoo and take snapshots of baby animals with their mother. Have pupils arrange these into groups labeled MAMMALS, BIRDS, REPTILES, etc.
2. Visit the Humane Society to learn the proper care of domestic animal babies. After returning to the classroom have pupils demonstrate what they learned in handling and caring for the guinea pigs.
3. Use an equal arm balance and pans to find out how much the mother and the baby guinea pig weigh. Compare and show with physical objects the difference in weights.

4. For one week keep a simple chart showing how much water and food the mother and the baby guinea pig eat. Use several different foods to find out which is preferred.

5. Paint a picture of a mother and a baby guinea pig. Show how it feels to touch. Show its texture. (Easel painting activity--provide cardboard chips and sponges 1"x1" to make texture.)

6. Look at study prints of animals; discuss similarities and difference between adult and baby animals. Have pupils paint a picture of a mother and a baby animal doing something "fun."

7. Look at study prints of animals for textures. Give each child a piece of acetate, fur, and sandpaper. As you show the study prints, have the child hold up the corresponding material.

8. Display a study print of an adult animal for the children to see. Ask them to draw or paint a baby animal for the adult.

FURTHER QUESTIONS FOR DISCUSSION

1. What color is the baby? Is it the same color as the mother?
2. What shape is a guinea pig?
3. How does a guinea pig's coat feel?
4. What does the baby animal do when he is afraid?
5. How does the guinea pig use his feet? What can he do with them?
6. How does the guinea pig act when he is hungry?

WORK SHEET IDEAS

I. What shape is the baby animal? Draw a line from the shape to the animal.

II. Animals have textures. Draw a line from the texture to the animal.

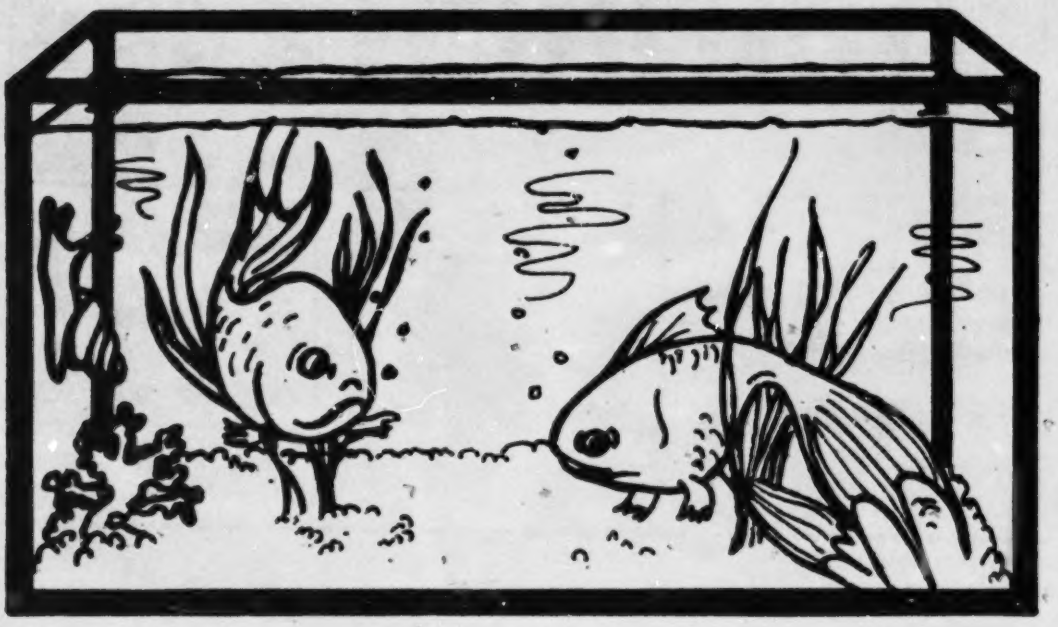
Texture

Animal

. *Living things are interdependent with one another and with their environment.*
. *Shapes can be seen in fish and animal shapes.*

CLASSROOM LEARNING CENTER: ANIMALS

ANIMAL COMMUNITIES



BEGINNING ACTIVITIES

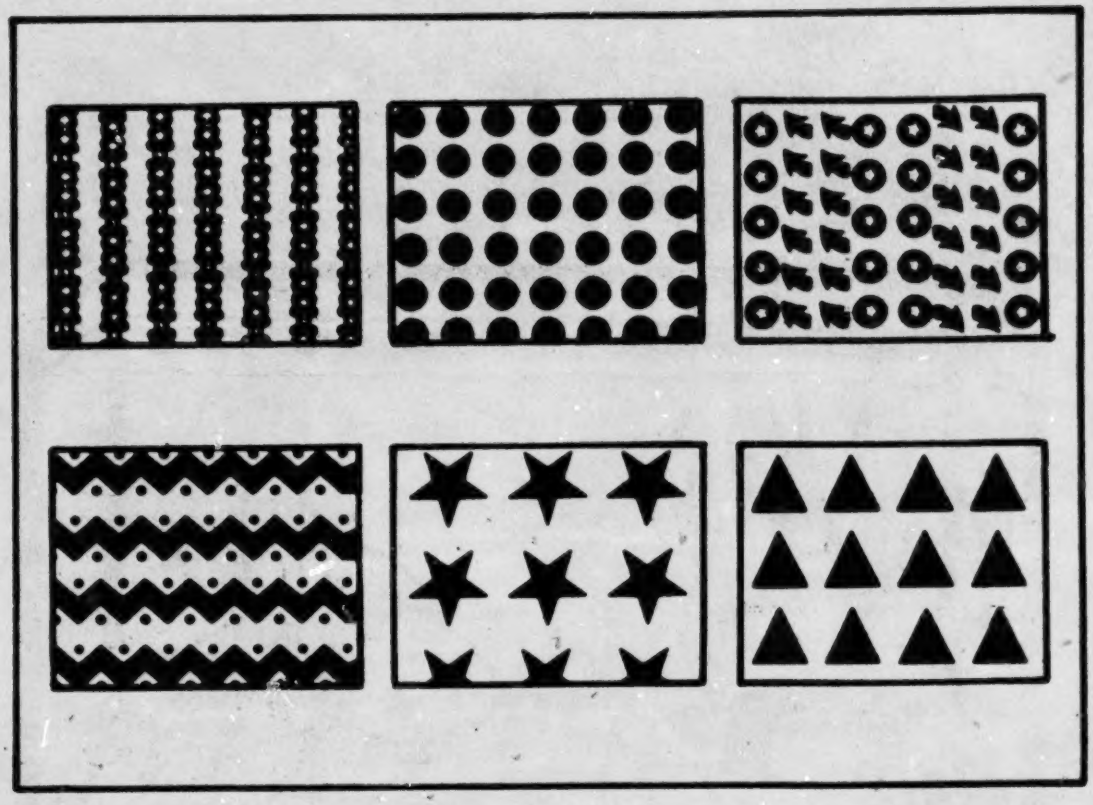
1. The pupil will describe orally a goldfish and snail observed in an aquarium and tell of some of their behaviors.

2. Given an aquarium thermometer, the pupil will keep a daily log of the aquarium temperature in the morning and afternoon.

3. The student will visually identify basic geometric shapes that combine to make the outline shape of a goldfish.

4. The students will demonstrate the ability to observe and create pattern through the use of repetition of shape at regular intervals.

BULLETIN BOARD IDEA



MATERIALS

1 five-gallon aquarium
6 pieces of water plants (Be ready to replace as goldfish will eat some.)
2 pounds of aquarium gravel
1/2 bag of small stones
1 dip net
Small bottle of *de chlor*
3 pairs of goldfish, 1-2 inches in length
5 small freshwater snails
Box of fish food
2 large hand lenses
Overhead projector
Transparencies (Attachments 1, 2, 3)

Books

A Sourcebook for the Biological Sciences by Evelyn Morholt, Paul Brandwein and Alexander Joseph. Harcourt, Brace & World, Inc., 1967. Decentralized in each building. See pages 605-610. (Upper grade teachers or school media centers have this reference.)

A Sourcebook for Elementary Science by Elizabeth B. Hone, Alexander Joseph and Paul F. Brandwein. Harcourt, Brace & World, 1962. Decentralized in each building. See pages 46-49. (Same distribution as above.)

Concepts in Science, Grade 1. Text, pages 106-109.

Filmstrips:

Fs 590.7 Gordon's Goldfish (P-K)
Fs 590.7 Our Aquarium (K-P)
Fs 591.92 Animals of the Pond (P-I)

Study Prints:

SP-S 591.92 Adaptations to Water Environments: Community Life (Col) P or I
SP-S 591.929 Pond Community: A First Inquiry (Col) P or I

Library Books:

597 & Sci(P) Darby, Gene. *What Is a Fish?* Illustrated by Lucy and John Hawkinson. Benefic Press, 1958.

597 & Sci(P) Selsam, Millicent Ellis. *Plenty of Fish.* Illustrated by Erik Blugrad. Harper & Row, Publishers, 1960.

590.7 & Sci(I) Zim, Herbert Spencer. *Goldfish.* Illustrated by Joy Buba. William Morrow & Company, Inc., 1947.

594 Schisgall, Oscar. *The Remarkable Creature, the Snail.* Julian Messner, 1970.

574.92 Reynolds, Christopher. *The Pond on My Windowsill.* Pantheon Books, 1970.

FACILITATION OF THE CLC

Introduce the CLC to the entire class. Ask any or all of these questions and discuss with pupils:

1. How many fish are in the aquarium? How many snails?
2. What do they need to keep alive?
3. What is in the aquarium besides fish?
4. What is an animal community? How do snails help the fish? How do the fish help the snails?
5. What kind of shapes do goldfish have? Do all fish have the same shapes?
6. What is pattern? Are all patterns the same?
7. Do fish have patterns on their bodies or fins? Do you think all fish have the same patterns? Say, "Each pupil that chooses the Animal

Communities Learning Center will find out more about the goldfish and snails. We will try to find out about the questions we have discussed by observing, reading and viewing filmstrips. We will keep some charts to show what we find out about how the fish and snails help each other. We will also look closely at the goldfish to see what else we can learn. We will find out how we can draw and paint goldfish or other special fish. We will learn about their shapes. We will also learn about pattern. We will look for things that have pattern on them. We will learn how to make our own patterns and how to make patterns very much like those fish have.

ADDITIONAL ACTIVITIES

1. Visit the Wild Animal Park of the San Diego Zoo to find out which hoofed African animals live in the same enclosure together. Have parents collect a list with the pupil's help. Discuss why the animals are together rather than in separate enclosures.

2. Visit the Natural History Museum seashore exhibits. Have pupils guess possible ways various animals of the tide pool zone depend on each other.

3. Make a classroom chart such as the following and have children working with the aquarium fill in their daily observations or dictate information to you to record.

Fish-Snail Community

Date	Water Temperature		Location of Snails				General Observations: Fish	General Observations: Plants
	A.M.	P.M.	Wall 1	Wall 2	Wall 3	Wall 4		

4. Have the pupil dictate a booklet about the snail and the fish to an older child. This should be done after observing and using references and audio-visual material for several weeks. Have the pupil illustrate his story.

5. a. Use overhead projector and transparencies (Attachments 1, 2, 3) to discuss how fish are made up of many shapes.

   b. Have children do Work Sheet A.

6. Have the students observe the goldfish in the aquarium and decide what shapes they see in them. Have them draw one goldfish using their crayons and the method stresses in #5 above.

7. a. Discuss pattern using "Bulletin Board Idea," page 18 of this publication. Make a list of patterns found in the classroom.

b. Provide a center for printing pattern. You will need sponges; tempera paint; small aluminum foil trays to hold sponges; carrots, potatoes, or small gadgets to print with, i.e., small cardboard tubes, small pieces of doweling, etc.; and paper to print on.

   Have students create pattern by printing. Stress repetition of shapes in an orderly manner.

8. Have students paint a large fish at the easel on 18"x24" or larger paper. Encourage them to paint the water around the fish also. While the painting is drying have them observe the fish scales for pattern. When the painting is dry have the students print in a fish scale pattern at the printing table.

FURTHER QUESTIONS FOR DISCUSSION

1. If we put twice as many fish in the tank, what might happen? Twice as many snails? Twice as many plants?

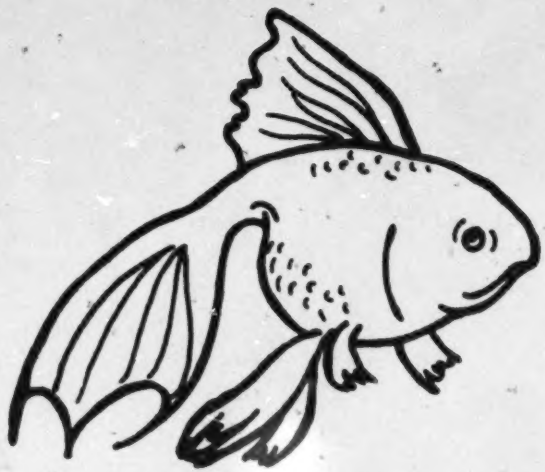
2. If we stop using fish food, what do you think the fish would do to the plants? To the snails?

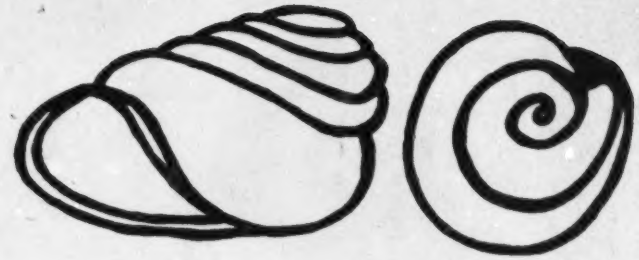
3. Do all fish have the same pattern on them?

4. Are all fish the same size and shape?

5. If we look for shapes that are found in a fish, will they always be the same shapes?

Name _____ B





I am a _____

I live in _____

I need _____ and

_____

I use my _____ to swim.

I like to eat _____ and

_____

We are _____

We live in _____

We like to eat _____

_____

We help keep aquariums _____

We have cousins who live on _____

_____

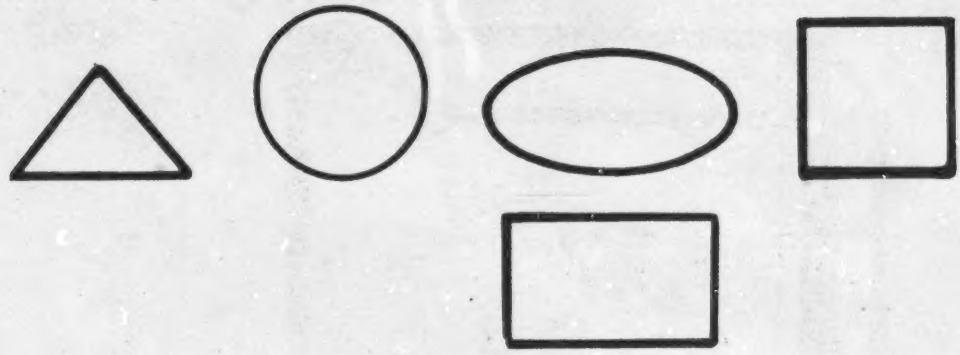
AQUARIUM COMMUNITY

What is missing? Draw it. Color the aquarium.

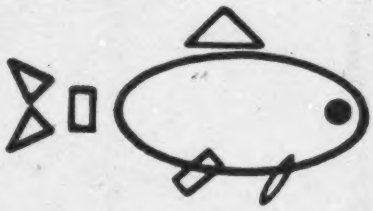
Name _____

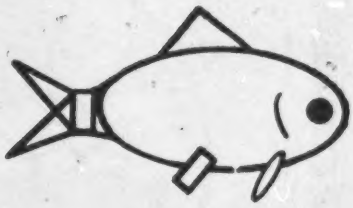
FISH HAVE SHAPES

These are shapes.



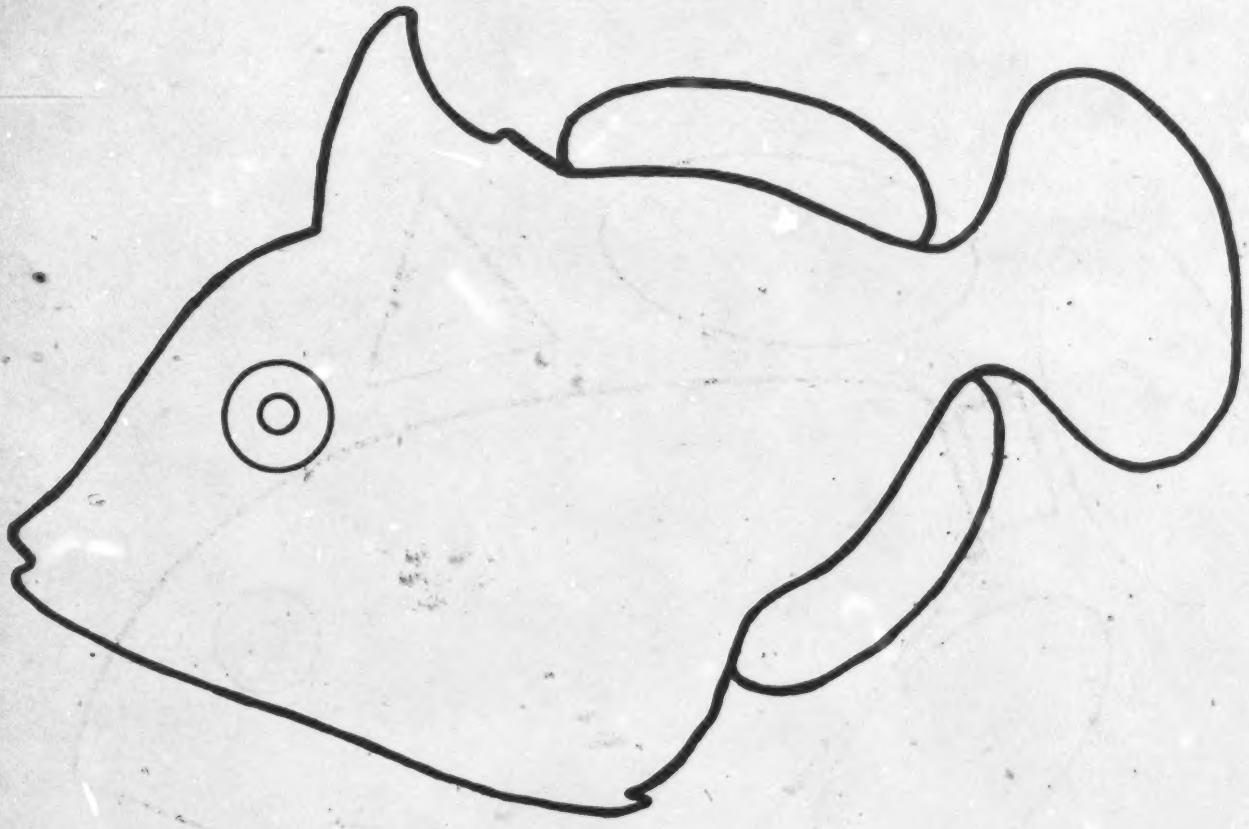
We can put some of these shapes together like this.

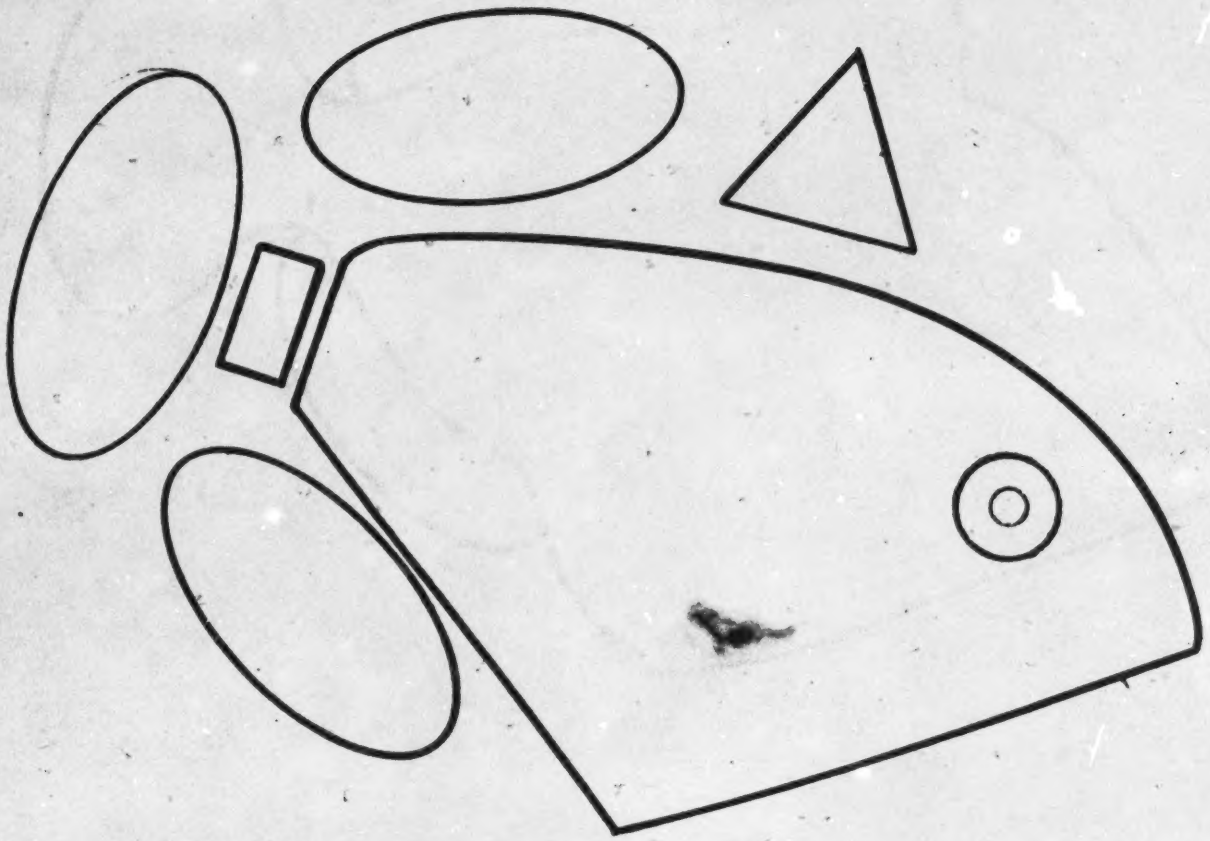


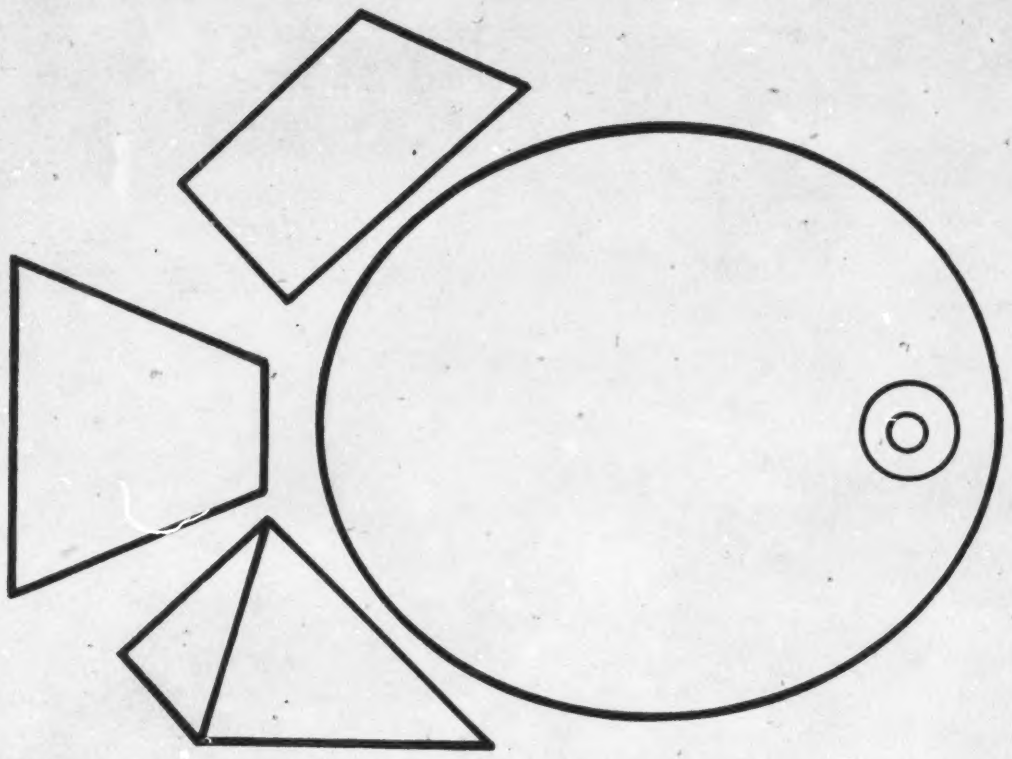


When we connect all the parts together, we get this.

Now you try it.







. *Living things are interdependent with one another and with their environment.*

. *A new color can be mixed from other colors; it can be dark or light; it can contrast or camouflage.*

CLASSROOM LEARNING CENTER: ANIMALS

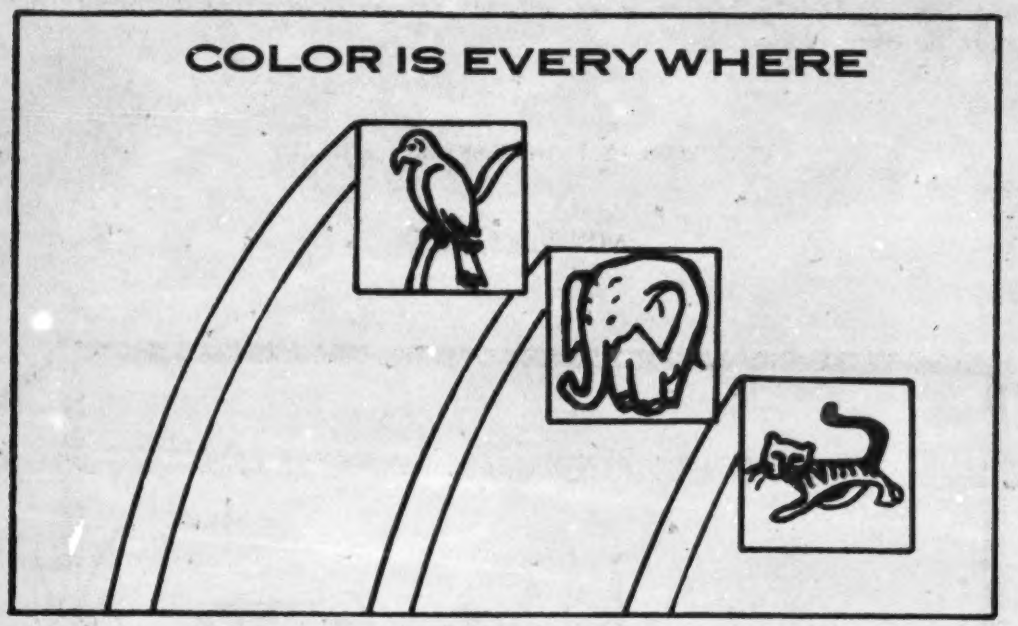
ANIMAL HABITATS

BEGINNING ACTIVITIES:

1. The pupil will identify the water, plants, space and food necessary for frog life.

2. The pupils will identify dark and light colors and arrange them in order from light to dark.

BULLETIN BOARD IDEA



MATERIALS

5-gallon aquarium with glass lid (taped around edges)
1 large low bowl
Various "woodland" terrarium plants
Gravel, charcoal
Humus or leaf mold
A few small rocks
2 small frogs (*Rana pipiens* or *R. palustris* or *R. Clamitans*)
Mealworms (keep separate for food)
2 large hand lenses
Tape recorder and blank tape
Thermometer
8mm projector
Filmstrip viewer
(Art materials listed with activities)

Book:

A Sourcebook for the Biological Sciences by Evelyn Morholt, Paul F. Brandwein and Joseph Alexander. Harcourt, Brace & World, Inc., 1958. (See pages 612-14 and page 648.)

Filmstrips:

Fs 372.3 How Do You Feel About Animals and Plants? (P)
Fs 597.8 Freddie the Frog (P)

Fs 597.8 Tree Frog (I)
Fs 752 Color (I thru A)
Fs 752 Understanding Color (I thru A)

S8mm Box 372.3 How To Set Up a Swamp Terrarium; How To Set Up a Forest Terrarium (2) (P or I)
S8mm Box 597 Frog (P or I)

Study Print:

SP-S 597.8 Life Cycle of a Frog (Col, Manual) K or P

Library Books:

597 & Sci(P) Darby, Gene. *What Is a Frog?* Illustrated by Lucy and John Hawkinson. Benefic Press, 1958.

CL 3 Kumin, Maxin Winokur. *Eggs of Things.* Illustrated by Leonard Shortall. G.P. Putnam's Sons, 1963.

RA Welber, Robert. *Frog, Frog, Frog.* Drawings by Deborah Ray. Pantheon Books, 1971.

597 & Sci(I) Zim, Herbert Spencer. *Frogs and Toads.* Illustrated by Joy Buba. William Morrow & Comapny, Inc., 1950.

Wolff, Janet. *Let's Imagine Colors.* E.P. Dutton & Co., Inc., 1963.

Abisch, Roy. *Open Your Eyes.* Parents Magazine Press, 1964.

Shuttlesworth, Dorothy Edwards. *Animal Camouflage.* Natural History Press, 1966.

FACILITATION OF THE CLC

Introduce the CLC by having all the materials on hand for making the woodland terrarium. Ask these questions and discuss with pupils:

1. What do you already know about frogs? What else would you like to know about them?

2. How can we make a habitat for some frogs out of this empty aquarium and these materials? (Point to woodland materials and aquarium.) Say, "Each of you will have a turn at setting up our aquarium and changing it to a terrarium to house two frogs. I will need volunteers to do these things." (Have list on board or chart.)

   a. Arrange gravel.
   b. Arrange bowl and humus.
   c. Plant ferns and other plants.
   d. Arrange rocks and ornaments or small statues.
   e. Water plants.

f. Place frogs in terrarium.
g. Feed frogs mealworms.

"What do you already know about color? What would you like to know? Each of you who chooses to work in the CLC will learn about--

"a. Mixing paint to make different colors.
"b. Making colors darker or lighter.
"c. Making colors show up because of contrasts.
"d. How animals and birds use color for camouflage."

ADDITIONAL ACTIVITIES

1. Visit the San Diego Zoo to observe the likenesses and differences between habitats for the prairie dogs and the elephants. Ask pupils to be ready to describe how these needs are met for both types of animals.

   a. Shelter
   b. Water
   c. Food
   d. Exercise
   e. Control of extreme heat and cold

2. Visit the Natural History Museum to verify guesses about the type of habitats in which these animals live.

   a. Audubon cottontail
   b. Skunk
   c. Golden eagle
   d. Barn owl
   e. Dusky-footed wood rat
   f. Moray eel
   g. Fish
   h. Snake

   (Have pupils dictate their lists to you before visiting the museum--then compare on return.)

3. Pupil uses a hand lens and a tape recorder. He dictates onto the tape everything he notices about the frogs' actions under any of these conditions:

   -Eating of mealworms
   -Temperature rise or decline in the terrarium
   -Adding of larger bowl of water
   -Adding flies or pill bugs as food
   -Reducing or increasing moisture in terrarium
   -Adding another frog to the terrarium
   -Adding or subtracting plants

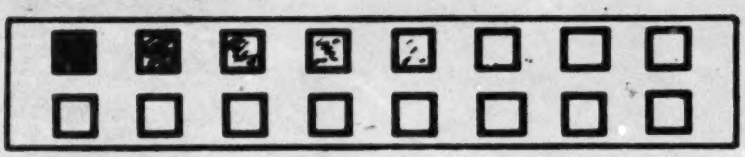
4. Record data about the frogs onto charts or work sheets with a format such as the following:

Habitat and Frogs

Date	Habitat Condition Altered	Frogs' Activities
5-15	Added 3 mealworms	Ate them all.
5-16	Put terrarium in direct sunlight	Stayed under plant.
5-17	Put black construction paper all over terrarium	
5-18	Put in bowl of water twice as big as one we had	

5. The pupil uses filmstrips and viewers to learn about mixing secondary colors from primary colors--red, yellow, blue. He/she uses tempera paints to mix orange, green, violet paint from the three primary colors. The pupil makes a chart:

6. The pupil uses magazines to find dark and light shades of blue (or red, green, orange, etc.) which he/she cuts out and arranges from light to dark on a piece of white construction paper. Using tempera paint with black and white the student mixes tints (with white) or shades (with black) to match the pieces mounted on white construction paper directly below and on the same paper.



Colors cut from magazines

Matched colors painted with tempera

7. The pupil paints two pictures using the same colors of paint but paints one on dark (black) paper and one on light (white) paper. The pupil uses black, white, light blue, medium blue and dark blue tempera paint. When complete, the pupil records the colors in order of ability to be seen from a distance. He/she should find that light colors are more visible on dark paper and dark colors are more visible on light paper.

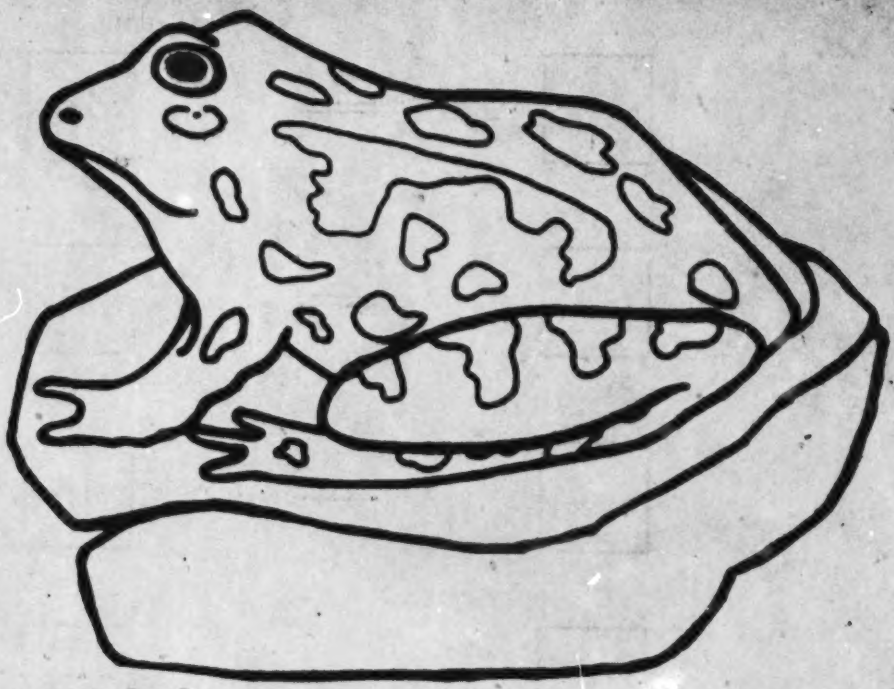
8. The student will use the book *Animal Camouflage* to find how color is important to camouflage of animals. The students will create a mural to show how animals' and birds' colors blend into the surroundings. The pupils will use tempera paint and mix and blend colors that are appropriate to the mural they choose. The entire surface should be covered with paints

applied either with brushes or sponges for textured effects. (The mural can be sketched with yellow board chalk directly on the paper before painting. Draw large birds or animals first and then develop the background.)

FURTHER QUESTIONS FOR DISCUSSION

1. What must a frog have to stay alive?
2. Where would you most likely find a frog in January? May?
3. How do frogs "talk"?
4. Are all animals camouflaged in their natural environment?
5. Are baby animals more camouflaged than the adults?
6. Why are male birds usually more colorful than female birds?

Name _____



I am a _____.

I like _____ and

_____ near me.

I eat _____ and

mealworms.

I use my tongue to _____ my food.

I live near _____ or _____.

I help man by eating _____.

I use my hind legs for_____ and _____.

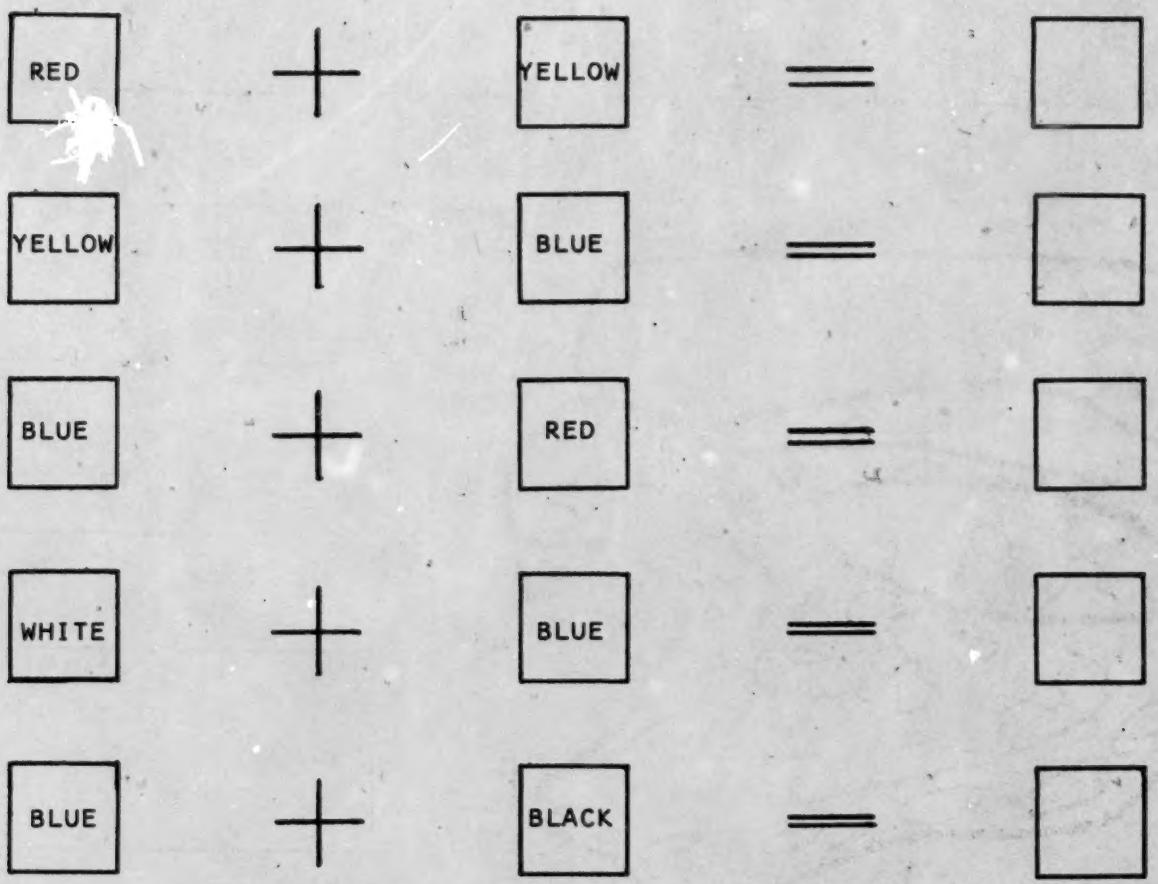
I start out in life as an _____.

Next, I become a _____ and then a _____.

Name _____ C

MIXING COLORS

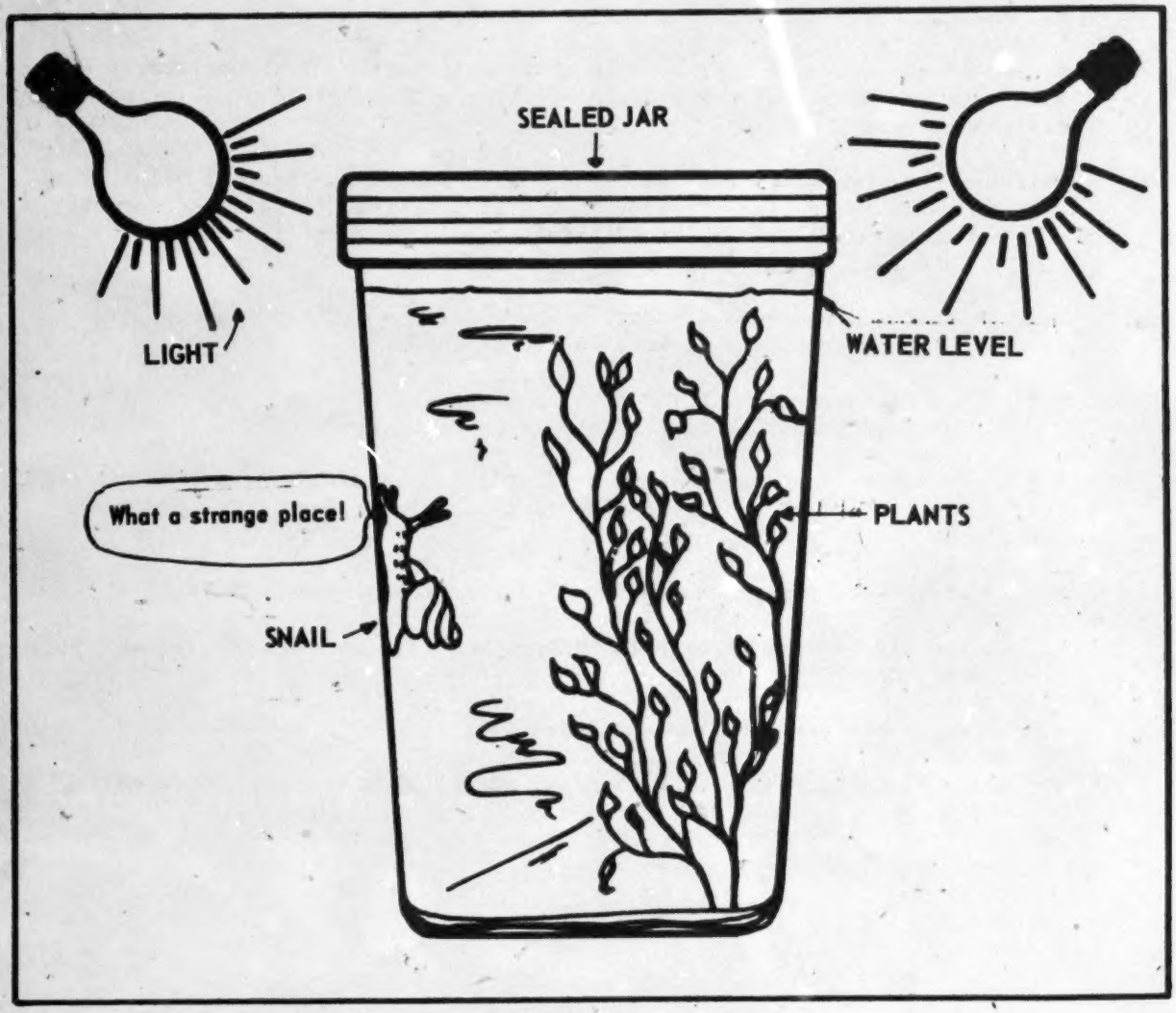
Directions: Use paint to fill in all the squares.



- *Living things are interdependent with one another and with their environment.*
- *The size and relationship of an object in a painting determines the importance to the viewer.*

CLASSROOM LEARNING CENTER: ANIMALS

WEB OF LIFE



BEGINNING ACTIVITIES

1. Each team of six pupils seals a freshwater snail and an aquarium plant in a baby food jar containing aquarium or pond water. Each team keeps a daily record of what happens. They also seal a snail in an identical jar under the same conditions, except without a plant in the jar. They keep a daily record of what happens.

2. In their records about the snails, pupils are to find answers to these questions plus two questions of their own:

   a. How long did each snail live?
   b. Which snail lived the longest?
   c. How did each snail get air and food?
   d. How did the plant get food and carbon dioxide?

3. A team of six students will work in three pairs after first collaborating to create six identical snails each cut from a 3"x5" piece of white paper. Assignments are:

   Pair 1--Using two different sheets of 9"x12" paper, on sheet #1 paint or color the entire sheet to look like grass and flowers. Color snail and paste on. On sheet #2 paint or color the snail and paste to a sheet of tan or brown paper.

   Pair 2--Follow directions for Pair 1 above only use 12"x18" paper. (The size of grass and flowers should be larger.)

   Pair 3--Follow directions for Pair 1 above only use 24"x36" paper. (The size of grass and flowers should be the largest of all.)

4. The six students completing activity 3 will arrange all six assignments on the bulletin board to be viewed and discussed by the team. Discuss these questions:

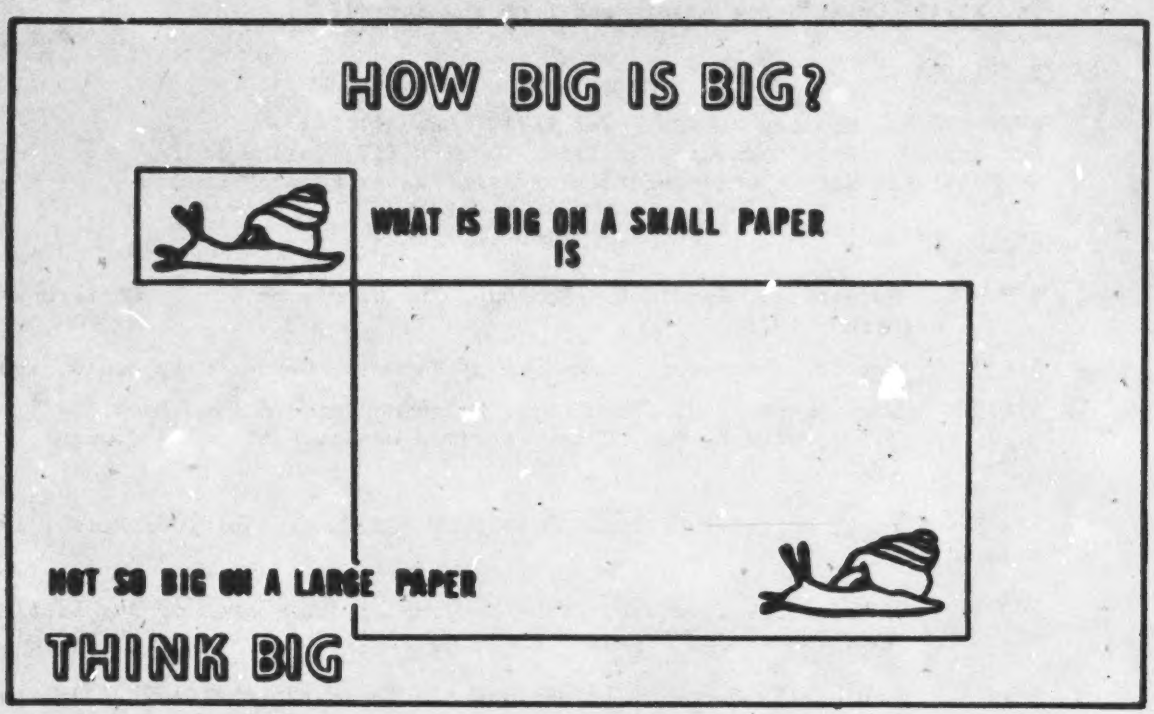
   a. In which size paper does the snail appear most important? Why?

   b. As the size of the paper gets bigger, what happens to the size of the snail? Why?

   c. In which pictures are the snails easiest to see? Why?

   d. Which pictures, plain or with grass and flowers, are most interesting? Why?

BULLETIN BOARD IDEA



MATERIALS

6 large hand lenses
12 large baby food jars (same size)
12 freshwater snails (same species and size)
Pond water or aquarium water for 12 jars above
6 small pieces of the same aquarium plant
5-gallon aquarium

Books:

A Sourcebook for the Biological Sciences by Evelyn Morholt, Paul F. Brandwein and Joseph Alexander. Harcourt, Brace & World, Inc., 1958. (See pages 528-32.)

A Sourcebook for Elementary Science by Elizabeth B. Hone, Alexander Joseph, Edward Victor and Paul F. Brandwein. Harcourt, Brace & World, Inc., 1962. (See pages 49-57.)

Filmstrips:

Fs 574.5 Park Pond (I or J)
Fs 574.5 Walk Around a Pond, Part I (P or I)
Fs 574.5 Walk Around a Pond, Part II (P or I)
Fs 574.5 Walk Around a Pond, Part III (P or I)

Fs 581.13 How Plants Make Food (I)
Fs 581.13 Solar Storehouse: Food from the Sun (I)

Study Prints:

SP-S 574.5 Ecology Series - Set 1 (12, Manual) I-J
SP-S 591.92 Pond Community: A First Inquiry (12, Col) P or I
SP-S 591.929 Nature's Communities: A Fresh Water Pond (P or I)

Library Books:

574.5 Hungerford, Harold R. *Ecology: The Circle of Life.* Childrens Press, 1971.

574 Pettit, Theodore S. *The Web of Nature.* Garden City Books, 1960.

574.5 Wong, Herbert H. *Pond Life: Watching Animals Find Food.* Illustrated by Tony Chen. Addison-Wesley Publishing Company, Inc., 1970.

574.92 & Sci(I) Buck, Margaret Waring. *Pets from the Pond.* Abingdon Press, 1958.

590.74 McClintock, Theodore. *Tank Menagerie; Adventures of the Little-Game Hunters of Fenway.* Abelard, 1954.

594 Schisgall, Oscar. *That Remarkable Creature, the Snail.* Julian Messner, 1970.

745.54 Keany, Carla. *The Art of Papier Mâché.* Chilton Book Company, 1968.

PB Lionni, Leonard. *The Biggest House in the World.* Pantheon Books, 1970.

Rottger, Ernst. *Creative Clay Design.* Van Nostrand-Reinhold Company, 1967.

Kampman, Lothar. *Creating with Tempera Paints.* Van Nostrand-Reinhold Company, 1968.

Loan Exhibits from the Natural History Museum:

Birds (plastic mounts): Mallard (duck) or Kingfisher
Insects (Riker mounts): Dragonflies, Damsel flies, or Giant Water Beetles
Reptiles and Amphibians (plastic mounts): Bullfrog or Hawsbill turtle
Mammals (plastic mounts): Raccoon or bat

FACILITATION OF THE CLC

1. View the filmstrips about ponds with the entire class and plan where and how to collect enough freshwater insects, pond water and plants to fill several large jars or an aquarium. (Parents should help with this task.) Organize the class into two task groups as follows:

Group 1:
a. Water boatmen
b. Water striders
c. Mosquito larvae
d. Dragonfly and damsel fly larvae
e. Diving beetles
f. Snails
g. Freshwater algae and plants
h. Worms
i. Guppies
j. Pond water
k. Pond mud
l. A few twigs, 10 inches long

Group 2:
a. Dip nets
b. Jars and aquariums
c. Metal and plastic containers
d. Kitchen strainers lashed to sticks
e. Aluminum pans and tweezers
f. Separate labeled jars for predator insects
g. Separate jars for plants and excess water insects to serve as a food source for the main aquarium
h. Cheesecloth to cover jars and aquarium.

2. When the pond water and insects are in place in the classroom, direct six pupils to spend two 30-minute periods on the first day to determine the answers to these questions:

   -What water insects are in the aquarium?
   -What do they seem to do?
   -What do they look like? (Pupils draw a picture of each one.)

   Have pupils report their findings to the rest of the class.

3. Read the book *That Remarkable Creature, the Snail* and discuss where snails live naturally. Discuss the differences in the environments. Read also and look carefully at the illustrations in *The Biggest House in the World.* Discuss the illustrations. How are they different than *That Remarkable Creature, the Snail?*

4. Have the students plan a mural on the snail, using what they have learned about the size of objects in relationship to the paper and what they know about snails.

5. Have students discuss what they want to show about snails. Place colored mural paper on the bulletin board and have students draw directly on the colored paper with chalkboard chalk. Erasing of mistakes can be easily done with the hand or a soft cloth. Ask students to evaluate the mural using these questions, before painting:

   a. Are the snails important in size? How do you know?
   b. Will this mural show all we know about snails?
   c. Is the background space interesting to look at?
   d. Could we improve this mural in any way? How?

   Begin painting. Evaluate as work progresses.

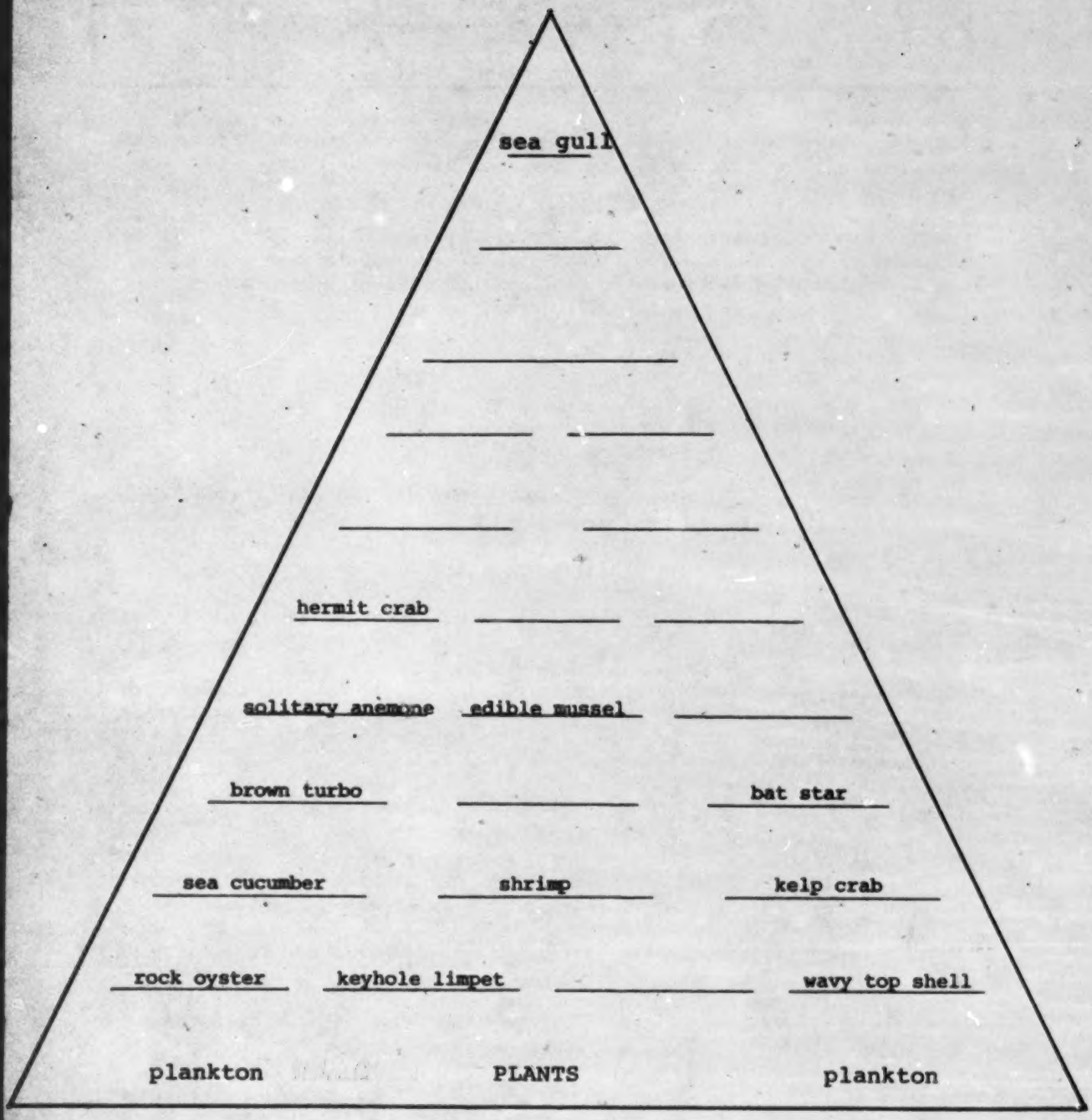
ADDITIONAL ACTIVITIES

1. Visit the San Diego Wild Animal Park and try to find out what the food chain is below these animals: Cuban Whistling Duck, Hooded Crane.

   Draw pictures of the above birds while at the park.

2. Visit the rocky shore exhibit at the Natural History Museum. Complete the food web on the following page.

ROCKY SHORE FOOD WEB



3. Make a mural showing the food chain observed in the pond water aquarium.

4. Find out what the plant zones are in a lake or pond and what freshwater animals are found in each zone. Show in a diorama or mural. (Use CLC books for references.

5. Conduct simple investigations on some of the life collected in the pond aquarium to show how man sometimes harms the web of life in a pond. In small jars of pond water try to find out how water insects respond to these conditions. (Be certain all jars are open.)

   a. Add three drops of soap to one jar.

   b. Add three drops of bleach to one jar.

   c. Add three drops of oil to one jar.

   d. Add three puffs of cigarette smoke to one jar and seal.((Teacher may do this when class is not present.)

   e. Add heat (teacher supervises) to one jar.

   f. Add three tablespoons of dirt swept from the sidewalk or hardtop to one jar.

6. Place a large water beetle and three guppies in the aquarium. Keep records to show how long it takes for the food chain to end up with the largest animal being alone with no more food. Discuss with the class how much food a guppy or water beetle needs in five days.

7. View film "Papiér Mâché" or "How To Make Papiér Mâché Animals" or filmstrip Fs 745.54 "We Work with Papiér Mâché" or read the book *The Art of Papiér Mâché* by Carla Kenny. Plan and construct a papiér mâché insect or bird using newspaper crumbled and/or rolled as the armature. Rolled tubes of newspaper held in place with string or tape will make excellent legs.

   Be sure to apply at least four layers of paper strips before decorating.

8. After visiting the Wild Animal Park and making sketches (see Additional Activity #1), use sketches as basis for clay relief birds. View pages 33, 39, 40 and 41 of *Creative Clay Design* by Ernst Rottger.

9. Paint a picture of the Cuban whistling duck or hooded crane using tempera paint. Refer to *Creating with Poster Paint*, pages 34 and 69.

10. Paint a picture of seashore life using page 44 of *Creating with Poster Paint* as a source idea.

11. Using *Creative Clay Design*, page 85, as a source idea, create a three-dimensional bird of clay. Be sure to add texture.

12. Using *Creative Clay Design*, pages 71-72, create a three-dimensional fish. Be sure to include textural effects.

FURTHER QUESTIONS FOR DISCUSSION

1. What is the web of life in a pond?

2. What happens to a food chain when one animal becomes extinct?

3. Why do you think some state and national parks close down picnic areas, campgrounds and trails for a year or more?

4. Where do we have ponds and lakes in San Diego? Why are fishing licenses necessary?

5. Why do artists sometimes draw birds and animals not exactly as they would look in a photograph?

6. How do artists make you know what the important part (center of interest) is in a picture?

7. Do all artists draw or paint alike?

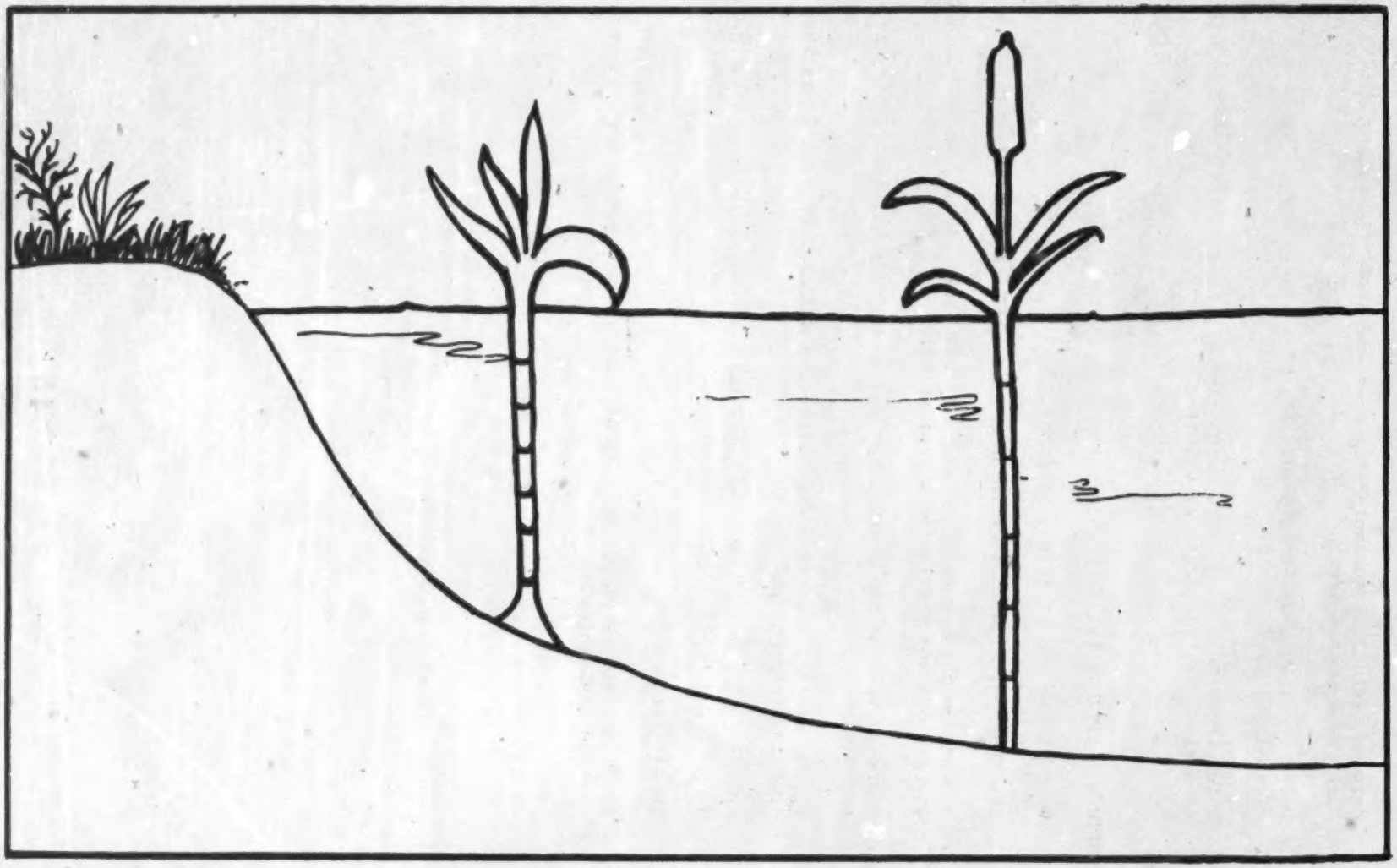
8. Do illustrations or pictures by artists always have to have the same colors as "the real thing"?

45

Name _____ D

ECOSYSTEM OF A POND

Directions: Draw all the animals and plants you have learned about.



APPENDIX

HELPING VANISHING SPECIES†

Today nearly 1,000 species of fishes, reptiles, birds and mammals are approaching extinction. One of the main functions of the San Diego Zoo and Wild Animal Park is to preserve vanishing species. These rare animals are helped by encouraging them to have young in captivity. The park has been particularly successful because the animals have a great deal of space in their enclosures and thus many that do not normally breed in captivity are now having young.

Listed below are familiar vanishing species with the reasons why they are rare. The animals with an asterisk have had young at the zoo or park.

Vanishing Species	Reason (See key below)	Protected by State Law	Protected by Federal Law
Green Sea Turtle	1 4	x	x
Galapagos Tortoise*	1 4 9		x
Desert Tortoise*	10	Illegal to possess	
Alligator	1 2	x	x
Horned Lizard (Horny Toad)	1 10	Possession controlled	
Rosey Boa*		by state law	
Brown Pelican	6	x	x
Least Tern	1	x	x
Bald Eagle	1 6 7	x	x
Squirrel Monkey	10		x
Orangutan*	1 10		x
Timber Wolf*	1 5 7	x	x
Polar Bear*	2 5	x	x
Grizzly Bear	5 7		x
Mountain Lion	1 5 7	x	
Tiger*	1 2 3 5 7	x	x
Snow Leopard	2	x	x
Cheetah*	1 2 5	x	x
Przewalski's Wild Horse*	8		
Hartmann's Mountain Zebra*	2 4 8	x	
Rhinoceros*	1 3 5		x
Bighorn Sheep	1 5 8	x	

Reasons:

1. Destruction of natural habitat.
2. Killed for skins, feathers, etc.
3. Killed because of folklore medicine and superstition.
4. Hunted for food.
5. Killed for sport or trophy.
6. Victim of pesticides.
7. Poisoning and predator persecution.
8. Competition with domestic animals.
9. Introduction of alien animals.
10. Trapped for pet market, laboratories, etc.

†Courtesy of San Diego Zoo

Name _____ Date _____

SAN DIEGO NATURAL HISTORY MUSEUM*

FIND THE EXHIBITS THAT GIVE YOU THE CORRECT ANSWERS TO THESE STATEMENTS:

1. _____ The dusky-footed wood rat is common in: (a) chaparral, (b) the eastern part of our desert, (c) coastal scrub habitats, (d) among oaks and pines in the mountains.

2. _____ The Audubon cottontail is: (a) common throughout the county, (b) blind and naked at birth, (c) abundant on the coastal side of the mountains, (d) all of these.

3. _____ The California Jackrabbit: (a) is common throughout the county, (b) is born with fur and open eyes, (c) has a lighter-colored species in the desert, (d) all of these.

4. _____ The long-tailed weasel: (a) is active only at night, (b) is very common throughout the county, (c) is a predator of rodents, (d) never kills poultry.

5. _____ Skunks: (a) rarely occur west of the mountains, (b) feed on lizards, and other reptiles, (c) have furs that are of no economic importance, (d) are subject to rabies.

6. _____ Badgers are of great importance because: (a) they are so destructive to rodents, (b) they are uncommon animals, (c) they have powerful, shovel-like feet, (d) they are shy and retiring, but will fight savagely if brought to bay.

7. _____ The largest member of the pigeon family living in California is the: (a) band-tailed pigeon, (b) Western Mourning Dove, (c) Cedar Waxwing, (d) Western Tanager.

8. _____ Although Western Mourning Doves are classified as game birds, you should not shoot them because: (a) they feed mainly on weed seeds, (b) one dove's stomach contained 7,500 weed seeds, (c) it is one of our most beneficial species, (d) all of these answers.

9. _____ The "Year Round Hummer" of the San Diego region is the : (a) Ruby-throated Hummingbird, (b) Scarlet Hummingbird, (c) Anna's Hummingbird, (d) none of these answers.

10. _____ The San Pedro Martir Coyote is commonly called: (a) a varmint, (b) the Prairie Wolf, (c) sneak wolf, (d) chicken catcher.

11. _____ Wading shore birds that have very long down-curved bills are: (a) Western Willets, (b) Marbled Godwits, (c) Long-billed Curlews, (d) Avocets.

12. _____ A wading shore bird with a long, slightly up-turned beak and red legs is the: (a) Black-necked stilt, (b) Green-winged Teal, (c) Avocet, (d) Western Willet.

13. _____ Mushrooms: (a) can be easily determined whether or not they are poisonous, (b) that are poisonous have no known antidote, (c) are parasitic, (d) are saprophyles, (e) all of these answers.

*Courtesy of the San Diego Natural History Museum

14. _____ Which of these statements are not true:
(a) About 250 sq. yds. of leaf surface produces enough starch to feed a man a year.
(b) Green plants produce about 200 billion tons of organic carbon a year.
(c) Plants synthesize sugars, starches, fats, proteins, and cellulose.
(d) Plant chlorophyll is contained in small structures called "stoma."

15. _____ The conifer tree commonly having four needles in a cluster is the:
(a) Parry pinon, (b) Torrey Pine, (c) Sugar Pine, (d) Coulter Pine.

16. _____ Which of these statements are not true?
(a) Oak galls are occasionally used for making inks and dyes.
(b) Oak galls contain a high percentage of tannic acid, used in tanning leather.
(c) White sage galls are caused by insects in the order Lepidoptera.
(d) Some galls may be inhabited by several species of insects.

17. _____ The California Shrike is commonly called: (a) Butcher-bird, (b) Cactus wren, (c) wren tit, (d) bush tit.

18. _____ The Avocet is: (a) a resident of freshwater marshes, (b) commonly called "blue stockings," (c) commonly called "cobbler's awl bird," (d) all of these answers.

19. _____ The sea gull with a red spot on its lower beak is the: (a) California or Western gull, (b) Hermann's Gull, (c) Sabin's gull, (d) none of these answers.

20. _____ How many grams of DDT will prevent a pelican's egg from developing normally? (a) 0.0045, (b) 1.00, (c) 3.00 (d) 10, (e) none of these.

21. _____ The "Clown of the Pine Forest" is the (a) Stellar Jay, (b) Marbled Godwit, (c) Pine Squirrel, (d) California Shrike.

22. _____ The largest living bird in flight is the: (a) Condor, (b) Golden Eagle, (c) Bald Eagle, (d) None of these.

23. _____ The first true bird, which lived about 130 million years ago, was the: (a) Condor, (b) Archaeopteryx, (c) Aardvark, (d) Artiodactyla, (e) none of these.

24. _____ Hummingbirds have only ? feathers. (a) 200, (b) 300, (c) 900, (d) (d) 1,200.

25. _____ The only bird which uses a tool, a cactus spine to extract insects from holes, is the: (a) shrike, (b) woodpecker finch, (c) pigmy nuthatch, (d) Bewick's wren.

26. _____ The egg of the extinct elephant bird of Madagascar had a capacity of:
(a) one quart, (b) three quarts, (c) one gallon, (d) two gallons.

27. _____ How many species of living birds do ornithologists now recognize?
(a) 5,200, (b) 6,756, (c) 8,600, (d) over 1,000.

28. _____ Most marine birds have a special "salt gland" to extract salt from their blood;
(a) this gland is probably a modified salivary gland.
(b) this gland is located within their kidneys.
(c) this is popularly believed, but is not true.

29. _____ The bird which lays triangular-shaped eggs which will not roll off their nesting ledge is the: (a) Red Viro, (b) Black-bellied Plover, (c) Bufflehead, (d) Murre.

30. _____ There are about ___?___ species of insects contained in the phylum Arthropoda: (a) 350,000, (b) 850,000, (c) 980,000, (d) 1,500,000.

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EVALUATION FORM

Name of Evaluator _____ **Phone No.** _____

Name of School _____ **Grade(s)** _____

Title(s) of Classroom Learning Center(s): Animals evaluated

I. Major strengths

II. Major weaknesses

III. Specific suggested changes (list page references)

Use back of sheet and additional sheets if needed. Return completed form to Science Specialist, Education Center, Room 2041, or Art Specialist, Annex 4, Education Center.